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On-board automated recording for commercial motor vehicle drivers' hours-of-service compliance: the European experience

Introduction

Many countries regulate the hours of work of transport operators -- mariners, airline pilots, locomotive engineers, and commercial motor vehicle drivers. In the motor transportation sector, automated recorders are used in many countries, either under regulatory or legislative requirements or by the motor carrier's choice. One of the most common, and simpler, devices used for this purpose is a tachograph.

A conventional tachograph is a mechanical or electromechanical device that records data on circular paper cards. Depending upon its design, it uses either liquid ink or a stylus on a pressure-sensitive medium (carbon paper or similar). Tachographs are highly susceptible to tampering: a clogged or bent stylus renders the card unreadable. Even under the best of circumstances, the paper disks also are difficult to read, hampering enforcement efforts. For these reasons, the FMCSA and predecessor U.S. agencies have never accepted use of tachographs for recording of CMV drivers' HOS.

A specification for a new type of electronic tachograph has been developed by the European Union. It eliminates the stylus-and-paper recording mechanism in favor of an electronic record on a smart card with an embedded microchip. This device and the proposed legislation and specification will be discussed later in this paper.

Early Tachograph Regulations

To our knowledge, the European Union (EU)[1] is the only international body that, as a group, has adopted regulations as a group mandating recording of commercial vehicle drivers' hours-of-service (HOS). The earliest requirement for recording equipment was established in 1970 under European Commission (EC) Regulation No. 1463/70 and called for an analog disk tachograph. The requirement applies to the Member States of the European Union and to the nations of Eastern Europe under the European Agreement Concerning the Work of Crews of Vehicles Engaged in International Road Transport (AETR).

1 The Maastricht Treaty, signed in February 1992 and entered into force in November 1993, formed the legislative pathway for the European Union. Many of the regulations and legislative acts described in this paper were issued by the former European Economic Community.

According to information provided by Mannesman VDO, a manufacturer of tachographs, other countries outside Europe also require tachographs (in Africa: Morocco; in South America: Argentina, Brazil, Peru, Uruguay, Venezuela; in Asia: Israel, Turkey, Japan, South Korea, and Singapore.) Other nations, including Australia, are considering requiring tachographs.

EEC Council Regulation No. 3821/85

The 1970 regulation was amended in 1977 and again in 1985. The changes apparently were extensive enough that the 1970 regulation and 1977 amendment were repealed in favor of the new 1985 requirement.

Two regulations were signed on December 20, 1985 that concerned highway passenger and freight transportation. The first, Council Regulation (EEC) No. 3820/85, "on the harmonization of certain legislation relating to road transport," dealt with the general requirements for drivers, driving periods, breaks and rest periods, and payment methods. The other, Council Regulation (EEC) No. 3821/85, "on recording equipment and road transport," dealt with the recording equipment to be used to document drivers' duty and non-duty hours.

The regulations apply to vehicles in commercial use that are greater than 3.5 metric tons (9,200 lbs), and are used to carry 10 or more persons. Article 4 of Regulation 3820/85 exempts vehicles used for, among other things: public safety purposes, power and communication utilities, broadcasting, circuses and carnivals, specialized breakdown vehicles [towing], and vehicles used in collection and distribution of milk, milk products, and milk containers from farms.

The introduction to Regulation 3821/85 referred to the time requirements of the 1985 social legislation regulation, which apparently were more detailed than those of the 1970 version. The EC added:

> Whereas automatic recording of other details of a vehicle's journey, such as speed and distance covered, will contribute significantly to road safety and will encourage sensible driving of the vehicle; whereas, consequently, it appears appropriate to provide for the equipment also to record those details ...

Annex I to the regulation covered the requirements for construction, testing, installation, and inspection of the tachograph. The general requirements included a record of the distance traveled by the vehicle, its speed, driving time, other periods of the driver's work or availability, the driver's breaks from work and daily rest periods, and opening of the case containing the record sheet. The basic equipment requirements included distance, time, and speed recorders and displays. Additional design and performance specifications were provided for the visual display, recording instrument (stylus), recording sheets, the closing device for the instrument case, and the type-approval and other markings required. The requirements for the installation of the recording equipment and for the certification checks performed by the government authorities focused more on outcomes than on use of specific test methods.

Commission Regulation 3688/92, issued December 21, 1992, added requirements concerning data transmission integrity for electronic recording equipment. These new requirements allowed equipment seals to be removed to install, adjust, or repair speed limitation devices "or any other device contributing to road safety." More importantly, they added a requirement that specified physical protection of the cables connecting the recording equipment transmitter: they were now to have a continuous plastic-coated stainless [steel] sheath with crimped ends. EU Member States were directed to no longer grant type-approval after 1/1/94 to devices not complying with the amended regulation. Furthermore, vehicles placed in service on or after January 1, 1996 were to be equipped with recorders complying with the amended regulation.

Reviews of tachograph records

Council Directive 88/599/EEC, issued November 23, 1988, provided standard procedures for governments of Member States to perform compliance checks at roadside and at motor carriers' places of business. The Directive required a minimum number of checks to be performed annually (at least 1 percent of total working days, a minimum of 15 percent of the days to be checked at roadside and a minimum of 25 percent of the days checked to be at the place of business). The roadside checks were to include daily driving periods, breaks and daily rest periods, and prior days' records if irregularities were noted. The checks performed at the place of business were to include, in addition to the roadside-check elements, weekly rest periods, driving periods between rest periods, two-week driving hours, and compensation [make-up] periods for days when driving time was extended or

rest periods were shortened. The Directive also called for EEC Member States to perform coordinated roadside checks, to share information, and to use a standard Commission reporting form.

The most recent report available from the European Commission concerning EU Member States' inspection and maintenance activities relating to Regulation 3820/85 was released on February 15, 2000. It covered the period 1995-1996. Although all Member States submitted data, some only did so under threat of sanctions. Data from two States was incomplete and/or not in requested formats, and several States only submitted aggregate totals.

The report compared changes in violations between the last review, covering 1991-92, and the current review. The overall number of duty-status related violations increased, and the types of violations had changed. Although rest-period violations had decreased, violations relating to break times, driving times, and, to a lesser extent, schedules and duty rosters had all increased. From the Executive Summary:

> Offenses against driving time rules now represent the highest number of infringements. The statistics seem to reflect the increasing pressure on drivers to drive longer than permitted and to ignore the minimum breaks provided in the Regulation.

On the positive side, the number of roadside enforcement checks rose in most Member States between 1991-92 and 1995-96. It decreased in three States, but those States had already been exceeding the minimum 1 percent rate (the rates in Denmark, Germany, and Spain all exceed 2 percent). The report noted that States have taken other initiatives, such as improving their data-sharing capabilities, increasing fines, and immobilizing vehicles. It also anticipates the implementation of the new working time legislation and the adoption of the proposed digital tachograph requirements.

Development Leading to New Regulation

The mechanical tachograph has been subjected to criticism because it is susceptible to fraud, costly to maintain and to manage, and difficult to use for enforcement (see *Commercial Vehicle Safety: Technology and Practice in Europe*). In response to these continued concerns, the Council of the European Union adopted Common

Position No. 5/98 on December 11, 1997. It called for use of a digital tachograph, to be installed in all new CMVs subject to the regulation beginning 24 months from the date of publication of an amended regulation.

The Explanatory Memorandum accompanying the proposal for the digital tachograph and ancillary recording and information management systems provides background information for the European Community to consider in taking the necessary action to enact the legislation. The electronic tachograph is offered as a tool to improve enforcement of, and compliance with, the legislation relating to highway transportation, particularly the limit on hours of driving and the mandatory rest periods. The developers of the proposal recognized the limitations of the conventional tachograph – the potential for manipulating the recording and data transmission systems and the difficult and time consuming task of reading the paper disks – and provided what they viewed as a more "user friendly" alternative for the drivers and for roadside inspectors and office auditing officials. In addition, the use of the electronic tachograph would have the potential to promote equitable competition among transport companies, combat exploitation of drivers, and improve road safety.

Council Regulation 2135/98, which amended Regulation 3821/85 (rather than revoking it in favor of a new Regulation), was signed on September 24, 1998 and published on October 10, 1998. New vehicles subject to this regulation were to be equipped with the recording equipment starting 24 months from the date of publication, or beginning in October 2000. If EC type-approval had not been granted to any item of recording equipment conforming to the specifications set forth in the amended Annex IB to the regulation, the European Commission was to submit a proposal to the Council of the European Union for extending the deadline.

The type specification[2] for the digital tachograph was developed in part through cooperative discussions among the nations of the EEC, several electronic device manufacturers, and representatives of the motor transport industry. Among other things, the type specification calls for distance recording accurate to 1 km, periods of duty time (time and date) to an accuracy of 1 minute, and instances of power interruption exceeding 100 milliseconds. Installation specifications require an installation plaque containing calibration information and physically sealed connections and covers.

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2 As of early 2001, the type-approval code appears to have been assigned to six manufacturers: Berifors, Giesecke & Devrient GmbH, Mannesman VDO, OSCARD, Thomson Actia, and TVI Europe Limited.

The standard also incorporates a requirement for a driver Asmart card@ to be issued by EEC Member States that would serve as a digital record for at least the last 28 calendar days of the driver's work. The smart card would also serve as the driver's license, and, in some countries, it might also hold information related to social service and health care programs. Enforcement officials, mechanics, and supervisors would use smart cards that are tailored to provide access to and authorization to review categories of tachograph data appropriate to their duties.

In addition, the type specification contains a detailed and highly prescriptive data record format and information recording and storage standard.

The combination digital tachograph and smart card have the potential to significantly improve the accuracy and integrity of information recorded and retained. They can provide benefits through more efficient motor carrier and driver self-monitoring of HOS status, as well as providing an improved tool for roadside enforcement.

Current Status

On June 21, 2000, a document, "Communication from the Commission to the European Parliament and Council: Towards a safer and more competitive high-quality road transport system in the Community," announced a delay in the implementation date of the new regulation. Under the heading, "Monitoring of Road Transport," it stated:

> The forthcoming introduction of the electronic tachograph *at the end of 2002* [emphasis added] represents a significant step forward in improving the effectiveness of the enforcement measures. Such electronic recording equipment is bound to improve considerably the level of compliance with the rules, in particular, by ensuring better protection of recorded data and by enabling a large number of checks to be carried out in a short period of time.
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> **Timetable:** the action already embarked on with Regulation (EC) no 2135/98 will take effect at the end of 2002 / beginning of 2003.

In July 2001, two task forces ["Sub Working Groups," (SWG)] met to discuss unresolved issues in the areas of data recording and roadside enforcement. SWG Three addressed manual-input data, and focused upon differences, incompatibilities and inconsistencies between the current manual-tachograph regulation and the proposed electronic tachograph regulation. Many of them reflect the ability of a driver to make handwritten notes to a paper tachograph chart, a feature that the electronic tachograph does not offer. Examples include the entry of non-driving and work-availability time; the location where a driver starts and ends a working day; and the location and time when a driver crosses a border. Other issues focused upon the responsibilities of enforcement officials, including: breaking of the electronic tachograph's seal to obtain evidence of fraud; authority to copy data from a vehicle unit or a driver card; ensuring that a driver is not punished more than once based upon the same data.

SWG Four addressed data downloading. It restated the objectives for implementing the digital tachograph: at least the same level of enforcement as with the analog tachograph, the expectation that controls [oversight] would be more efficient, and the desire that road users would benefit. It concluded that the data transfer methods and data integrity principles were covered in Annex 1B to the Regulation. However, methods for remote downloading and data protection are "left to industry," and the detailed requirements for record maintenance are left up to EU Member States to specify. Although the SWG believes that there is an implicit requirement for motor carriers to make digital tachograph records available to enforcement officials, Regulation 2135/98 does not have sufficient legal basis, nor an explicit requirement, for officials to demand, during the course of a company check [place-of-business inspection], that data be downloaded from either the vehicle unit or the driver's card.

The Commission regulation anticipated in Council Regulation 2135/98, concerning the requirement for the electronic tachograph, had not been published. However, staff of the European Union anticipates that the Commission regulation will be published by the end of calendar year 2001.

Since the Council Regulation provides a two-year period before the devices must be installed in new vehicles, the earliest they would appear would be late 2003, if the anticipated enactment date holds. There is no requirement that the new devices be retrofitted into CMVs currently in service -- the type specification covered in the Annex to the Common Position [precursor to a regulation] covers only the new

device, and installation in new vehicles. It is likely to be several years before there are enough devices installed to form an adequate statistical population. At this time, we cannot assess enforcement experience with the new device.

References

Commission of the European Communities, 19th Report from the Commission on the implementation in 1995-96 of Regulation (EEC) 3820/85 on the harmonization of certain social legislation relating to road transport. Brussels, 15 February 2000, COM (2000) 84 final.

This report provides trends and statistics on EEC Member States' roadside inspection and enforcement activities, as they concern driving time, breaks, and rest period provisions of the current regulations.

Council Regulation (EEC) No 3821/85 of 20 December 1985 on recording equipment in road transport. *Official Journal No L 370, pp. 370/8-370/21.*

This is the current regulation requiring the use of tachographs and specifying their design and use.

Commission Regulation (EEC) No 3688/92 of 21 December 1992 adapting to technical progress Council Regulation (EEC) No 3821/85 on recording equipment in road transport. *Official Journal L 374, 22/12/1992, p. 0012-0013.*

This regulation amended the 1985 tachograph regulation to improve signal integrity.

Council Directive 88/599/EEC of 23 November 1988 on standard checking procedures for the implementation of Regulation (EEC) No 3820/85 on the harmonization of certain social legislation relating to road transport and Regulation (EEC) No 3821/85 on recording equipment in road transport. *Official Journal L325, 29 November 1988, pp. 0055-0057.*

This directive deals with the requirements for checking tachograph records.

Council Regulation (EC) No 2135/98 of 24 September 1998 amending Regulation

(EEC) No 3821/85 on recording equipment in road transport and Directive 88/599/EEC concerning the application of Regulations (EEC) No 3820/84 and (EEC) No 3821/85. Official Journal of the European Communities, L 274, pp. 1-21.

This Council Regulation would be the basis for a revised Commission Regulation on the digital tachograph. The Commission Regulation continues under development as of July 2001.

Explanatory Memorandum accompanying Proposal for a Council Regulation (EEC) 3821/85 and Council Directive 88/599/EEC on Recording Equipment in Road Transport (tachograph). COM (94) 323 final. Commission of the European Communities, Brussels, 22 July 1994.

This document provides a brief historical background and a limited discussion of estimated costs and benefits related to the digital tachograph.

Presentations, European Union Enforcement Sub Working Groups Three (Recording Data – Manual Input) and Four (Downloading). Tällsberg, Sweden. July 3-5, 2001.

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